REVIEW AND ANALYSIS OF OHIO'S EVIDENCE-BASED MODEL

KnowledgeWorks Foundation
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Contents

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INTRODUCTION

In his state-of-the-state address in January 2009, Ohio Gov. Ted Strickland made clear that improving Ohio's schools was critical to the future prosperity of the state, further arguing that the reform and funding of Ohio's schools should be based on an evidence-based model, stating: "We should design our education system around what works. I have embraced an evidence-based education approach that harnesses research results and applies those findings to Ohio's specific circumstances." (Strickland, 2009).

The governor's call for changes in Ohio's schools includes a number of new initiatives such as:

- Increasing the length of the school year to 200 days
- Providing full day kindergarten to all students
- Improving educator quality
- Establishing an effective accountability system

Important in what the governor said is the commitment to establishing educational programs and allocating resources to those programs on the basis of the best educational research. As he stated in his address, "My Ohio evidence-based plan is designed to provide the best education we can for all of Ohio's students. The elements of my plan are supported by evidence, and that evidence will guide our implementation of the plan over the next eight years." (Strickland, 2009).

This evidence-based approach to estimating the resources needed for a high quality education program is a widely accepted method of estimating school funding needs and for establishing a description of the resources needed to help all children meet their state's educational proficiency standards. Moreover, there is growing evidence that implementation of all the educational strategies embedded in and funded by the evidence-based model can lead to dramatic improvements in student learning in four to six years (Odden and Archibald, 2009). We are confident that we have sufficient knowledge today to teach all students to high proficiency standards and that the strategies funded by the evidence-based model are sufficient for schools and districts to "double student

performance on state tests"[1] in the medium term. Moreover, these strategies represent a good approximation of what research evidence and best practices suggest the education system can do *now* to improve student achievement for all children, including students in urban districts and from low-income and minority backgrounds.

This report, prepared for the KnowledgeWorks Foundation by the creators of the evidence-based approach to school finance adequacy, describes the Ohio Evidence-Based Model (OEBM), and compares it to one version of the evidence-based model widely available in the research literature (Odden, Goetz and Picus, 2007). We have used this particular version of the evidence-based model because it is our understanding that it is the version used by the Ohio governor's office in preparing the OEBM. [2]

It is our understanding that as this report is being drafted, there is considerable discussion regarding the OEBM proposals and their applicability to Ohio schools. Our analysis is designed to help inform this debate by providing a comparison of OEBM with our evidence-based model and to offer our insights into some of the important issues under discussion across Ohio as the model is considered.

As such the balance of this document is divided into four sections. The first provides background on new approaches to school funding, as well as more specific details on the design and development of the evidence-based model.[3] The second section offers a line-by-line analysis of the OEBM as described in a report published by the Ohio Office of Budget and Management in February 2009 (OBM, 2009). In this section we identify the similarities and differences between the OEBM and our recommendations, and provide a key to indicate where our recommendations exceed those of the OEBM, where OEBM

[1]We use "doubling" performance to connote large, quantum, absolute gains in student achievement. For example, doubling performance could mean increasing the percentage of students who score at or above the proficiency level from below average levels to much higher levels, such as from 30 to 60 percent or 35 percent to 70 percent. The phrase also would include doubling the percent achieving at or above the advanced levels, which should be the goal in states where the state proficiency level is closer in rigor to the basic level of performance of the National Assessment of Education Progress (NAEP). The phrase also would include doubling the percent achieving at or above proficient or advanced for a subgroup of students, such as students from low income or minority backgrounds. For districts starting at higher levels of student performance, the definition of doubling would include a district or school increasing the percent scoring at or above proficiency from 65 to 95 percent; even though not literally a doubling, such an increase represents large, absolute gains. The phrase "doubling" is meant to communicate large, significant, and measurable improvement.

[2] Note that in addition to the document used to develop Ohio's OEBM, a general description of the evidence-based model is available in Odden and Picus (2008). State specific descriptions of the evidence-based model can be found in: Picus, Odden, Goetz, Aportela and Archibald, 2008 (ND); Picus, Odden, Aportela, Mangan and Goetz, 2008 (WY); Odden, Picus, Archibald, Goetz, Mangan and Aportela, 2007 (WI); Odden, Picus, Goetz, Mangan and Fermanich, 2006 (WA); Odden, Picus and Goetz, 2006 (AR); Odden, Picus, et. al., 2005 (WY); Odden, Picus, Fermanich and Goetz, 2004 (AZ); Odden, Picus and Fermanich, 2003 (AR); and Odden, Fermanich and Picus, 2003 (KY).

[3] This section does not describe the research evidence on which the model's recommendations are based because comprehensive descriptions of that research and how we apply it to the resources needed at individual schools are available in our textbook (Odden & Picus, 2008), and in each of the state-specific studies documented in the reference section of this document.

provides more resources than our model and instances where such a comparison does not yield a clear determination of resource differences.

The third section of this document discusses a number of other issues surrounding the application of the OEBM. These include the use of the Ohio Instructional Quality Index, estimation of average teacher salaries and the approaches suggested for holding school districts accountable for their use of educational resources. The fourth section offers our conclusions.

Finally, because there has been considerable discussion in Ohio over the research base for the evidence-based model, we have included as an appendix the complete bibliography from our North Dakota Evidence-Based Study which was conducted in 2008. This appendix includes all of the references on which our recommendations are based.

1. NEW APPROACHES TO SCHOOL FINANCE

The OEBM is based on a school finance model known generically as the evidence-based model. The evidence-based model is one of four general approaches used to estimate how much money is needed to provide a level of resources that offers confidence that all or almost all students will be able to meet the learning standards of their own state. In this section we describe these four approaches briefly, and then provide a more detailed description of the evidence-based approach describing its use in other states.

DETERMINING SCHOOL FUNDING NEEDS

As indicated above, there are four general approaches to estimating school finance needs. Each approach has been used in multiple states to provide state and local policy makers with information on the estimated costs of funding the state's educational system. The figure that is derived from various studies provides information on the level of resources (often expressed in dollars) that are needed to provide programs that give all students the opportunity to meet state student performance standards – it does not necessarily provide information on how those resources should be raised, nor does it necessarily establish expectations on how funds should be used.

Two of the approaches to adequacy generate a cost figure, while the other two estimate the resources needed for an educational program that will meet student needs and from those resources estimate the statewide total costs of those resources. The first two include the successful district approach and the cost function method, while the professional judgment and evidence-based approaches offer schools and districts more guidance regarding the allocation and use of the resources the models generate. Each is described below.

Successful District

The successful district method should be familiar to policy makers in Ohio. It was used in the mid-1990s to estimate the costs of adequacy in Ohio (Augenblick, 1997; Alexander, Augenblick, Driscoll, Guthrie & Levine, 1995). This approach identifies a set of school districts that meet a state-established set of performance criteria and then uses the expenditures of those districts as an estimate of the costs of adequacy. In some versions of the model, efforts are made to estimate the additional costs districts face when the characteristics of their children differ from the average of the "successful" districts.

The successful district approach is attractive in that it is conceptually very straightforward and easy to understand. Problems occur if agreement on the criteria to use in determining successful schools is hard to obtain. Moreover, by changing the criteria, it is possible to change the estimate of funding needed to achieve adequacy. Finally, districts identified as "meeting standards" under the successful district model frequently identify relatively homogeneous, smaller suburban or rural districts as meeting the criteria for success and offer little information on how that figure might be adjusted to meet the needs of large urban and demographically complex districts. Fermanich, Mangan, et. al. (2006) describe some of the difficulties with this approach in Washington.

Cost Function

Cost functions use sophisticated statistical and econometric techniques to derive estimates of adequate school funding levels. A cost function estimates the expected costs of an educational system by specifying the level of student performance desired (i.e., an average score on a state standardized test) and then controlling for variations in student and district characteristics.

The advantage of a cost function compared to the successful district approach is that it controls more specifically for differences among students, schools and school districts. In theory, this approach can be used to estimate differences in how much should be provided for students from differing income levels, who are learning English or for children with disabilities. It can also be used to estimate cost of education differences based on district characteristics such as location, district size, etc. The down side to this approach is that the estimation procedures often appear to be a "black box" to state policy makers because of the complexity of the process. Many cost functions have estimated very high costs for urban school districts (often suggesting that students from low-income backgrounds need two or three times the resources of the average student in the state), also causing policy makers to question the model and wonder if the state can distribute resources to schools along those lines.

While both the successful district and cost function approaches have been used in a number of states, one major drawback to both is the lack of information about how the resources generated should actually be used by schools. The next two methods attempt to remedy this problem.

Professional Judgment

This method, as its name implies, relies on the judgment of professional educators to describe how a high performing school would be organized. Typically, teams of professional educators are brought together for a one- or two-day meeting where they are asked to develop their recommendations. In most cases prototypical schools at the elementary, middle and high school levels are used for resource estimation, and the panels are asked to indicate what resources (staffing, materials, dollar resources) they would need to have a reasonable assurance that all children would meet the state's performance standards. Individual panels can focus on different school levels, the needs of small schools or districts, central office costs, or the costs of special education. Once the resources are identified, the costs of those resources are estimated to generate an estimate of funding adequacy across a state.

The professional judgment approach has been used in many states and under a variety of circumstances. Its strength is that is relies on the knowledge and expertise of professionals working in the field. However, some have criticized this approach based on the composition or size of the panels and have expressed concern that panels might "game" the system to get more money – which clearly would be in their self interest.

One recent effort to enlarge the pool of participants relied on web-based surveys to random samples of school professionals in California (Sonstelie, 2007). Sonstelie

surveyed more than 500 education professionals to derive estimates of adequacy. Interestingly, his estimates were not that different from other estimates derived from two panels of nine educators (Chambers, et. al. 2007).

Evidence-Based

The basic approach of the evidence-based model is to identify school-based programs and educational strategies that research has shown to improve student learning. Although the rigor of the evidence supporting the effectiveness for each recommendation varies, this approach only includes recommends that are supported by either solid research evidence or best practices. In practice, these research findings have been used to describe the resources a school would need to dramatically improve the achievement and learning of all students. Evidence-based studies establish prototypical schools, estimate the resources needed at each school, aggregate school-level estimates to the district level, add central office costs for each district and sum the district totals to estimate the total statewide costs of the model's recommendations.

The evidence-based model was developed by the authors of this report. We have worked with a total of seven states (KY, AZ, AR, WY, WI, WA, and ND) to develop evidence-based estimates of educational costs. Two states (WY and AR) have used our model to allocate resources to schools and in North Dakota the legislature is currently debating the appropriate level of school funding using an evidence-based model we developed for the Governor's Commission on Education Improvement in 2008.

In all states where we have the opportunity to work, our process involves extensive interaction with a study committee to guide the work, as well as extensive professional judgment comment on the proposed study recommendations before they are finalized by the study committee. The legislative and governor's commissions with which we have worked all made modifications to our initial recommendations, sometimes enhancing our recommendations (smaller core class sizes in Wyoming) and occasionally supporting lower resource levels than we initially recommend (slightly larger elementary class sizes in Arkansas). In both states, the Supreme Court ruled the new systems to be constitutional, suggesting that marginal legislative modifications to our core recommendations are acceptable and can continue to meet constitutional requirements in many states.

In Wyoming, we developed a comprehensive school funding model that included both the research-based recommendations of the evidence-based model along with the desire of the Wyoming legislature to ensure the needs of that state's smallest districts and schools were fully met. We continue to work with the legislature and Wyoming Department of Education to monitor student outcomes and support the refinement of the model as it is used to fund schools.

In Arkansas, the findings from our adequacy studies have been converted into a single per-pupil funding amount that forms the basis of that state's foundation formula for funding schools. The amount appropriated each year for the foundation level (the base

per-pupil spending amount) is determined by the legislature with support from the legislative research staff.

The estimation of funding levels using the evidence-based approach varies from traditional school finance models in two ways. First, the evidence-based model builds funding estimates from the *school* level, not the district level. Even though states may continue to distribute money to school districts, and districts retain authority for how revenues will be used, the evidence-based model provides a school-by-school estimate of the resources that are generated at that level. Second, the evidence-based model assumes that all resources are available for the educational strategies it recommends. This too is a substantial variation from traditional school funding systems that view new programs and/or strategies from a marginal rather than comprehensive basis.

In our work across the country, we are frequently asked what the impact on student performance would be if schools deployed all the strategies embedded in the evidence-based model. And if resources to implement all of the strategies are not immediately available, how would we prioritize those strategies. Our approach to prioritization has been to provide each state with an analysis of the effect sizes research has identified for each strategy. This would allow them to choose the strategies that would be likely to be most effective quickly, if all resources recommended were not immediately available.

As a result of these efforts, some ask if the effect sizes can be summed, and others have suggested our work "promises" exceptional results on the basis of summing effect sizes. It is, of course, methodologically inappropriate to sum effect sizes, and we have never done so in our work with any state. There is no explicit research on schools that have deployed all the resources in the evidence-based model. Thus, our approach has been to study schools and districts in each state that have "doubled" student performance on state tests over a four- to six-year time frame. What we have found is that the strategies schools and districts use to produce these impressive student achievement gains are very similar to those included in the evidence-based model (Odden, Picus, Archibald, Goetz, Mangan and Aportela, 2007).

Of equal importance, we have analyzed similarly successful schools and districts that were studied by others, and found the same strategic patterns in use at those schools. Odden and Archibald (2009) summarize these findings and identify how schools can fund our evidence-based strategies through strategic spending of new resources and through resource reallocation strategies. Odden and Archibald also show how all the strategies are funded in the evidence-based model. Odden (forthcoming, 2009) expands on this argument, identifying 10 key strategies schools and districts can use to "double student performance" in the medium term, using the strategies included and fully funded in the evidence-based model.

This "first approximation" of how schools and districts can link resources to student learning is a recommendation of the most recent proposal for redesigning state school

funding systems published by the School Finance Redesign Project in the University of Washington's Center on Reinventing Public Education.[4]

Figure 1 summarizes the strategies embedded in the evidence-based approach.[5] These include small classes in core subjects (math, science, language arts, social studies and world languages) along with specialist teachers to ensure a rich liberal arts program of art, music and physical education, and to provide planning and collaboration time for core teachers. The model also includes a set of strategies to help struggling students and help them return to the regular classrooms and district curriculum as quickly as possible. Resources for professional development including instructional coaches, intensive summer workshops for teachers and resources to hire outside experts and/or travel to conferences are also part of the model. In addition, as Figure 1 shows, there are resources for special education, gifted and talented, career and technical education, school site administration, central district administration, and for maintenance and operations.

In the next section of this report, we compare the evidence-based model we have developed over time to the recommendations contained in the OEBM.

[4] Adams, Cross, Edley, Guthrie, Hill, Kirst, Liu, Loeb, Monk, Odden and Weiss (200).
[5] The details of the evidence-based model are not described here, but a line-by-line comparison of our model with the OEBM is provided in the next section.

The Evidence-Based Model:

A Research/Best Practices Approach Linking Resources to Student Performance

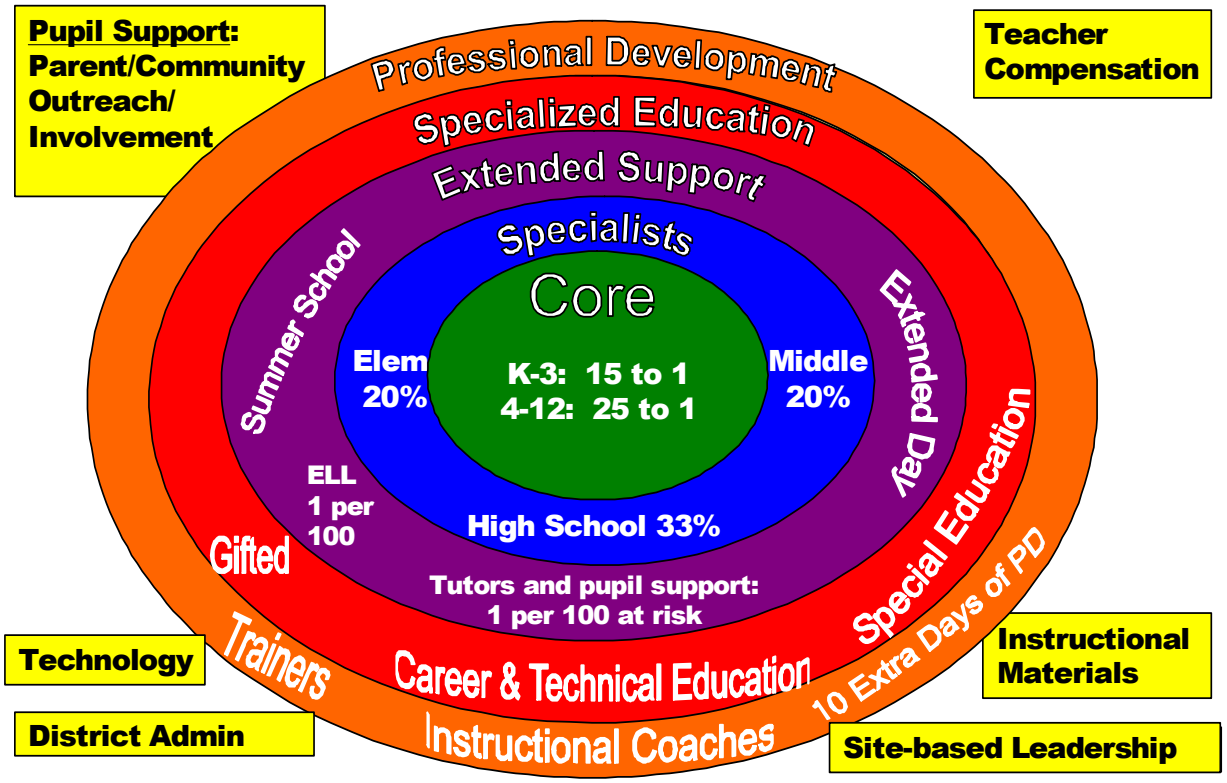

Figure 1: The Evidence-Based Model
The Cost Model

2. ANALYSIS OF THE OEBM

Table 1 provides a detailed, line-by-line analysis of the OEBM, comparing it with the evidence-based model we developed as part of our work for the School Finance Redesign Project. While the core recommendations in the evidence-based model are generally the same across states, as noted above, each state where we have worked has made some modifications to suit local needs. Consequently we have used the version of the evidence-based model that we developed for the School Finance Redesign Project because it is our understanding that was the document used by Ohio's OBM as a reference in designing the OEBM.

The first column identifies specific school/district model components. Columns 2-7 are pairs based on school level and identify the resources for each component from the evidence-based approach and the OEBM approach.

In addition, we have color coded a number of the table's cells. Yellow cells represent components where we estimate that the OEBM allocates fewer resources than our model, blue cells are those where the OEBM allocates more resources than our evidence-based model would allocate, and rose cells are those where an exact comparison is not possible.

The rows relate to the specific components of the model. The first rows consider the characteristics of the prototypical schools on which the models are based. Following that, rows represent the resources for each school level. The discussion that follows focuses on those areas where we observed differences between the evidence-based model and the OEBM.[6]

[6] In the text that follows, we distinguish our recommendations from the Ohio model by referring to our recommendations as the evidence-based model and the Ohio proposals as the OEBM.

Table 1
Comparison of Ohio Evidence-Based Model with Odden and Picus (2007)

School Element / School Characteristics	Elementary School (K-5)		Middle School (6-8)		High School (9-12)		Comments
	Evidence-based	OEBM	Evidence-based	OEBM	Evidence-based	OEBM	
School configuration	K-5	K-5	6-8	6-8	9-12	9-12	School districts with less than 800 students treated as one organizational unit
Prototypical school size	432	418	450	557	600	733	
Class size	K-3 15:1 4-5 25:1	K-3 15:1 4-5 25:1	25:1	25:1	25:1	25:1	
Full-day kindergarten	Yes	Universal	N/A	N/A	N/A	N/A	
Number of teacher work days	200 teacher work days, including 10 days for intensive training	Ohio model is silent on length of teacher contracts	200 teacher work days, including 10 days for intensive training	Ohio model is silent on length of teacher contracts	200 teacher work days, including 10 days for intensive training	Ohio model is silent on length of teacher contracts	
Student instructional days	No change in state practice	Increased by 20 days		Increased by 20 days		Increased by 20 days	

School Element	Elementary School (K-5)		Middle School (6-8)		High School (9-12)		Comments
	Evidence-based	OEBM	Evidence-based	OEBM	Evidence-based	OEBM	
Personnel Resources							
1. Core teachers	24	Driven by student to teacher ratio (class size) 23.2 for prototypical school size	18	Driven by student to teacher ratio (class size) 22.3 for prototypical school size	24	Driven by student to teacher ratio (class size) 29.3 for prototypical school size	Odden and Picus recommendation is driven by the student to teacher ratio as well. Values presented in this row are for the prototypical school in each grade level category
2. Specialist teachers	20% of core teachers 4.8	20% of core teachers 5.8	20% of core teachers 3.6	20% of core teachers 5.6	33% of core teachers 8.0	25% of core teachers 7.3	
3. Instructional facilitators (Lead teachers in OEBM)	One for every 200 students 2.2	One for each "organizational unit"	One for every 200 students 2.25	One for each "organizational unit"	One for every 200 students 3.0	One for each "organizational unit"	See definition of organizational unit below
4. Tutors for struggling students	1 certified teacher for every 100 students in poverty	1 certified teacher for every 100 students in poverty. Also expected to provide assistance with extended-day instruction and tutoring	1 certified teacher for every 100 students in poverty	1 certified teacher for every 100 students in poverty. Also expected to provide assistance with extended-day instruction and tutoring	1 certified teacher for every 100 students in poverty	1 certified teacher for every 100 students in poverty. Also expected to provide assistance with extended-day instruction and tutoring	
5. Teachers for ELL students	1 ELL teacher for every 100 ELL students	1 teacher for every 100 LEP students	1 ELL teacher for every 100 ELL students	1 teacher for every 100 LEP students	1 ELL teacher for every 100 ELL students	1 teacher for every 100 LEP students	

School Element	Elementary School (K-5)		Middle School (6-8)		High School (9-12)		Comments
	Evidence-based	OEBM	Evidence-based	OEBM	Evidence-based	OEBM	
6. Extended day	0.25 FTE certified teachers for ½ of students in poverty with a class size of 15	Part of responsibility of tutors for struggling students	0.25 FTE certified teachers for ½ of students in poverty with a class size of 15	Part of responsibility of tutors for struggling students	0.25 FTE certified teachers for ½ of students in poverty with a class size of 15	Part of responsibility of tutors for struggling students	
7. Summer school	0.25 FTE certified teachers for ½ of students in poverty with a class size of 15	$3,000 per summer teacher. Number of summer teachers is based half the number of economically disadvantaged children with a class size of 30	0.25 FTE certified teachers for ½ of students in poverty with a class size of 15	$3,000 per summer teacher. Number of summer teachers is based half the number of economically disadvantaged children with a class size of 30	0.25 FTE certified teachers for ½ of students in poverty with a class size of 15	$3,000 per summer teacher. Number of summer teachers is based half the number of economically disadvantaged children with a class size of 30	
8. Students with learning disabilities and who are mildly or moderately disabled	Funding for equivalent of 3 additional teaching positions, and 1.5 aide positions	Maintain special education weights and apply time to ADM rather than the funding amount generated by evidence based model which is district specific. Student teacher ratio of 20:1 assumed with weights funded at 90% assuming 10% is funded with Federal funds	Funding for equivalent of 3 additional teaching positions, and 1.5 aide positions	Maintain special education weights and apply time to ADM rather than the funding amount generated by evidence based model which is district specific. Student teacher ratio of 20:1 assumed with weights funded at 90% assuming 10% is funded with Federal funds	Funding for equivalent of 4 additional teaching positions, and 2.0 aide positions	Maintain special education weights and apply time to ADM rather than the funding amount generated by evidence based model which is district specific. Student teacher ratio of 20:1 assumed with weights funded at 90% assuming 10% is funded with Federal funds	
9. Students who are severely disabled	100% state reimbursement minus federal special education funds		100% state reimbursement minus federal special education funds		100% state reimbursement minus federal special education funds		
10. Gifted students	$25 per student	$25 per student	$25 per student	$25 per student	$25 per student	$25 per student	Funding is for all students in the school, to be used for gifted programs

School Element	Elementary School (K-5)		Middle School (6-8)		High School (9-12)		Comments
	Evidence-based	OEBM	Evidence-based	OEBM	Evidence-based	OEBM	
11. Career and Technical Education	N/A	N/A	N/A	N/A	No additional cost	10% of the core teachers, 2.9 for the prototypical school	
12. Substitutes	5% of lines 1-11	Ohio report is silent	5% of lines 1-11	Ohio report is silent	5% of lines 1-11	Ohio report is silent	
13. Pupil support staff	1 for every 100 students in poverty	1 for every 75 economically disadvantaged students	1 for every 100 students in poverty	1 for every 75 economically disadvantaged students	1 for every 100 students in poverty	1 for every 75 economically disadvantaged students	
14. Non-instructional aides	2	2	2	2	3	3	
15. Librarians, media specialists	1	$60,000 per organizational unit (phased in at 25% per biennium)	1	$60,000 per organizational unit (phased in at 25% per biennium)	1 librarian 1 library technician	$60,000 per organizational unit (phased in at 25% per biennium)	Comparison is based on complete phase in of Ohio model
16. Principal	1	1 per organizational unit	1	1 per organizational unit	1	1 per organizational unit	In Odden/Picus principal positions are pro-rated up and funded as assistant principals, under Ohio model a school that is double the prototypical size (equivalent of 2 organizational units) would presumably generate funding for 2 FTE principal positions

School Element	Elementary School (K-5)		Middle School (6-8)		High School (9-12)		Comments
	Evidence-based	OEBM	Evidence-based	OEBM	Evidence-based	OEBM	
17. School site secretary	2	1 Secretary, 1 clerk and one building manager per Organizational unit	2	1 Secretary, 1 clerk, and one building manager per Organizational unit	3	1 Secretary, 3 clerks, and one building manager per Organizational unit	It is not clear how the cost of a building manager compares to a secretary. We assume building managers are paid more than secretaries and thus the Ohio model provides more resources
18. Professional development	$100 per pupil	$1,833 per teacher (at an average of 18 pupils per teacher, this would be $127.29 per pupil when specialist teachers are included)	$100 per pupil	$1,833 per teacher (at a class size of 25 this is $91.65 per pupil when specialist teachers are included)	$100 per pupil	$1,833 per teacher (at a class size of 25 this is $91.65 per pupil when specialist teachers are included)	As Described above, Odden/Picus model also provides instructional facilitators and an additional ten days of teacher planning time which is part of the professional development component
19. Technology	$250 per pupil	$250 per pupil phased in at 25% per biennium	$250 per pupil	$250 per pupil phased in at 25% per biennium	$250 per pupil	$250 per pupil phased in at 25% per biennium	Comparison is based on complete phase in of Ohio model

School Element	Elementary School (K-5)		Middle School (6-8)		High School (9-12)		Comments
	Evidence-based	OEBM	Evidence-based	OEBM	Evidence-based	OEBM	
20. Instructional materials	$165 per pupil	$165 per pupil phased in at 25% per biennium	$165 per pupil	$165 per pupil phased in at 25% per biennium	$200 per pupil	$165 per pupil phased in at 25% per biennium	Comparison is based on complete phase in of Ohio model I took our numbers from Adams report, which should be the core source
21. Student activities (Student enrichment)	$200 per pupil	$200 per student phased in at 25% per biennium	$200 per pupil	$200 per student phased in at 25% per biennium	$250 per pupil	$200 per student phased in at 25% per biennium	Odden/Picus model includes athletics. Ohio model specifically excludes athletics but is otherwise silent on athletics
22. Counselors	Not specifically included, but could be funded with pupil support dollars	Not included	1 per 250 students	1 per 250 students	1 per 250 students	1 per 250 students	
23. Nurse's aide	0	1 per organizational unit	0	1 per organizational unit	0	1 per organizational unit	
24. Registered nurse	0	1 per school district	0	1 per school district	0	1 per school district	
25.District administration	9 Professional and 9 Support positions for a district of 3,500 students	1 superintendent, 1 treasurer for each school district phased in at 25% per biennium	9 Professional and 9 Support positions for a district of 3,500 students	1 superintendent, 1 treasurer for each school district phased in at 25% per biennium	9 Professional and 9 Support positions for a district of 3,500 students	1 superintendent, 1 treasurer for each school district phased in at 25% per biennium	
26. Operations and maintenance	state average per pupil	$902 per pupil phased in at 25% per biennium	state average per pupil	$902 per pupil phased in at 25% per biennium	state average per pupil	$902 per pupil phased in at 25% per biennium	

School Element	Elementary School (K-5)		Middle School (6-8)		High School (9-12)		Comments
	Evidence-based	OEBM	Evidence-based	OEBM	Evidence-based	OEBM	
27. Pupil transportation	Previous year district expenditure per pupil pending development of a formula based on needs	Previous year district expenditure per pupil pending development of a formula based on needs	Previous year district expenditure per pupil pending development of a formula based on needs	Previous year district expenditure per pupil pending development of a formula based on needs	Previous year district expenditure per pupil pending development of a formula based on needs	Previous year district expenditure per pupil pending development of a formula based on needs	
28. District characteristics adjustments	Hedonic or Comparable Wage Index	Ohio Instructional Quality Index	Hedonic or Comparable Wage Index	Ohio Instructional Quality Index	Hedonic or Comparable Wage Index	Ohio Instructional Quality Index	Note that the Ohio index includes measures of poverty and income and differs substantially from a comparative wage index

Notes:
OEBM Source: Funding a 21st Century Education System: Ohio's Evidence-Based Model (OEBM)
Comparison is based on Odden, Goetz and Picus, 2007.
Organizational Units – The total district enrollment by school level is divided by the average size for that level of school to arrive at the number of "organizational units" in each district. The average sizes are Elementary 418; Middle School, 557; and High School 763.
Yellow boxes – Ohio resources are less than Odden/Picus model
Blue boxes – Ohio resources exceed Odden/Picus model
Rose boxes – Can't determine how Ohio resources compare to Odden/Picus model

School Configuration and Size

Both the evidence-based and OEBM models use the same grade configurations:

- Elementary – K-5
- Middle – 6-8
- High School – 9-12

Prototypical school sizes vary somewhat, with the prototypical elementary school being slightly smaller in OEBM (418 v. 432) and somewhat larger for middle (557 v. 450) and high schools (733 v. 600). In addition, the evidence-based model when used as a funding formula in other states relies on proration of the resources in prototypical schools in direct relation to school size with the exception of very small schools (less than 100 students), and for principal positions (a school double the prototypical size would receive one principal and one assistant principal rather than two principals). On the other hand, OEBM relies on a defined "organizational unit" for actual allocation of resources. The OEBM documentation says that total district enrollment by school level is divided by the average size for that level of school to arrive at the number of organizational units in each district. These organizational units are then used as the basis for allocation of many resources, regardless of the number of schools the district actually has.

This approach is somewhat similar to an analysis we conducted in Wisconsin. We used a set of prototypical schools in a prototypical district to estimate a statewide average "base" expenditure, augmented by categorical programs for the various student categories represented in the model: those from poverty backgrounds, those learning English, and those with disabilities. We then estimated a total cost of the new program. As a comparison, we built up the model from every school in every district, tailoring all the recommendations to the actual school size and its demographics. While the alternative approaches provided somewhat different amounts to each district, the total statewide costs were almost the same, suggesting that either approach was valid. The approach being used by Ohio is a variation of our first approach.

Core class sizes are the same for both models, student-teacher ratios of 15:1 in grades K-3 and 25:1 in grades 4 and above. Both would increase the number of teacher contract days, The OEBM requires that over eight years the length of the school year increase to 200 days, while the evidence-based model includes funding for between 190 and 200 teacher contract days, which includes a 10-day intensive summer professional development workshop that focuses on instruction and curriculum. OEBM would thus increase student instructional days by 10 a year, whereas the evidence-based model would suggest using the extra 10 days for professional development for teachers rather than instruction for students.

Educational Resources

Teachers

As Table 1 shows, because the core teachers are based on identical class size numbers, the number of core teachers that would be provided to any school is the same ratio in

both models. Specialist teachers are provided at the formula of 20% of core teachers for both elementary and middle schools in both models. This provision allows middle schools to have a six-period day with each teacher teaching just five periods a day and allowing for one period for collaborative work with other teachers on the curriculum and instructional program as well as some individual planning and preparation time. At the elementary level, time would be available each day for the specialists to teach art, music and PE while teachers engage in planning and collaborative work.

However, the OEBM resources specialist teachers at 25% for high schools, whereas the evidence-based model resources specialist teachers at the rate of 33% of core teachers to facilitate 90-minute block class schedules in high schools. The impact of this difference is that it is harder to structure high schools with block schedules; on the other hand, both models provide more specialist teachers for high schools as those schools often provide a larger array of elective classes.

Instructional Coaches

OEBM provides fewer instructional coaches than the evidence-based model. While funding coaches at one per instructional unit (instead of one per 200 students) probably provides more coaches than are currently found in Ohio schools, OEBM resources are at about one half (elementary) to one third (high school) the level in the evidence-based model, potentially limiting the effectiveness of this important strategy (Odden and Picus, 2008, chapter 4 show in a summary of effect sizes that coaching is one of the potentially most effective way to help students learn). We usually recommend that states first fund the full range of professional development resources in the evidence-based model before many other strategies. The reason for this emphasis is that improved instruction is the prime way to improve student performance, and improved instruction evolves through high quality and ongoing professional development. Further, instructional coaches are key to making professional development work and to ensuring change in instructional practice. Instructional coaches provide hands-on assistance to individual teachers in their own classrooms, helping them change their instructional strategies to more powerful ones.

Tutors

OEBM supports the same level of tutors for struggling students and English language learners (ELL) as does the evidence-based model: one tutor for every 100 students from a poverty background and one additional tutor for every 100 ELL students. It should be noted that most ELL students also come from low-income backgrounds, so they generate extra resources for poverty in addition to the resources generated to provide instruction in English as a Second Language.

Extended Day and Summer School

Resources for extended day are assumed to be part of the responsibility of the tutors under OEBM and are funded separately in the evidence-based model.

For summer school, both the evidence-based model and the OEBM use as indicators of need half the count of poverty students. The evidence-based model however assumes an eight- to nine-week, academically oriented summer program with class sizes of 15, and assumes teachers are paid an amount equal to 25% of their regular school year salary and benefits. The OEBM provides for class sizes of 30 and funds a stipend of $3,000 per teaching position.

Special Education

For special education services, OEBM retains the current education weights for all children with disabilities and assumes student-teacher ratios of 20:1 with the state paying 90% of the additional cost and districts the remaining 10%. Under the evidence-based approach prototypical elementary and middle schools are funded for three additional teaching and 1.5 aide positions, and prototypical high schools receive 4 teaching positions and 2 aides. In addition, children with severe disabilities would be funded 100% through state and federal funds under the evidence-based model. It is not possible to compare the estimated costs these alternative approaches.

Gifted and Talented

Both models provide $25 per pupil for services for the gifted and talented. Since most services for gifted and talented are essentially no- or low-cost approaches – grouping all such students together and accelerating instruction, skipping grades, etc. – the regular funding formula includes adequate resources for such students and the additional allocation provides a modest amount of funds for enrichment services.

Career and Technical Education

The evidence-based model does not provide additional staffing for Career and Technical Education, whereas the OEBM provides 2.9 FTE teaching positions at a prototypical high school. This approach is similar to that in Wyoming, where the legislature went beyond our initial evidence-based recommendation.

Substitute Teachers

While the evidence-based model funds substitute days at a rate of 5% of the teaching positions generated at the school, the OEBM appears to be silent on this issue, so it is not clear how substitutes would be funded under OEBM.

Pupil Support Staff

Interestingly, the OEMB provides somewhat more resources in terms of pupil support staff for struggling students, resourcing these positions at one for every 75 economically disadvantaged children compared to one position per 100 economically disadvantaged children in the evidence-based model.

Non-Instructional Aides

The evidence-based model and OEBM fund the same number of non-instructional aides at all three school levels.

Librarians

Under the evidence-based model recommendations, librarians are funded at one per school at all levels, and high schools also are funded for one library technician. The OEBM funds librarians at $60,000 per organizational unit at all three levels and phases this funding in over four biennia, or eight years. At the elementary and middle school levels, it is not possible to ascertain which model provides more funding for librarian positions. At the high school level, it appears that the evidence-based model offers more support to school districts,

School Site Administration

Principals are staffed at one per prototypical school in the evidence-based model and one per organizational unit under OEBM. This is basically the same level of funding, except that under the evidence-based model, principal positions are not prorated downward until a school has approximately 100 students whereas the OEBM appears to prorate downward from the prototypical sizes. Moreover, a school with 200 elementary students would generate a full-time principal under the evidence-based model and approximately half a principal under the OEBM. This means a district with a number of relatively small schools would receive fewer principal resources under OEBM than under the evidence-based model.

Clerical Staff

The OEBM funds the same number of clerical staff (secretaries and clerks) at the elementary and middle schools, but provides one more clerical position at the high school. More importantly, OEBM funds a building manager at each school site. Our understanding is that the building manager is akin to a clerical position except that individual also has responsibility for procurement and other business activities, allowing the principal more time to serve as the educational leader at the school. If the building manager is funded at the level of a clerical position, then the OEBM provides funding for one more clerical position at the elementary and middle school level and two more clerical positions at the high school level than identified in the evidence-based approach.

Professional Development

In our minds, professional development includes three components: additional pupil-free teacher days for training that could occur in summer workshops, instructional coaches and training funds at the rate of $100/pupil for outside experts, central office professional development staff and/or teacher attendance at conferences. The additional days and instructional coaches were discussed above; here we compare the allocation of additional

funding for professional development. The evidence-based model allocates $100 per pupil for all students to provide funds for the training aspect of professional development. This is approximately the same as allocated under the OEBM. The OEBM report calls for $1,833 per teacher. At a class size of 25, plus an additional 20% for specialist teachers, we estimate this to be equivalent to about $90 per student. If we assume that class sizes in elementary schools average 18 per teacher (15 K-3 and 25 4-5) then professional development funding at elementary schools would be approximately $127.29 per pupil, or about 25% more than the evidence-based model.

In sum, the differences between the evidence-based and OEBM models on professional development are:

- the evidence-based model provides for 10 pupil-free days for training; it is not clear if the OEBM model provides these pupil-free days through the 200-day school year.

- the evidence-based model provides one instructional coach for every 200 students, which is more than twice the coaching resources than the OEBM model, which provides one instructional coach position for every school.

- the evidence-based model provides $100 per pupil for trainers, which is approximately equal to or somewhat less than the $1,833 per teacher provided by the OEBM.

Instructional Materials

For instructional materials, student activities and technology, the two models are similar, except OEBM has an eight-year phase-in period. Also, resources at the high school are lower for instructional materials and student activities. The evidence-based model also includes $25 per pupil for "formative assessments," which is a resource that all schools and districts doubling student performance now use and is something that is critical in the first year of implementation as it enables schools and districts to measure student progress as they seek to boost student performance.

Nurses

The evidence-based model assumes nursing support would be provided through staffing allocations for pupil support, whereas the OEBM provides one nurse per school district and one nurse aid per organizational unit.

Central administration appears to be severely underfunded through OEBM, which provides funding for a superintendent and a treasurer for each district, phased in over eight years. The evidence-based model projects 9 professional and 9 support positions in the central office for a district of 3,500 students, projected upward and downward depending on actual enrollments.

Operations and Maintenance

The evidence-based models we have developed generally fund operations and maintenance at the state average, which in the report used by Ohio was $890 per pupil. OEBM uses a figure of $902, which is approximately the same level of funding, but this support amount is to be phased in over eight years. It is our understanding that the figure was computed based on the average expenditure for maintenance and operations in districts today so the phase-in could result in under-funding for this expenditure category.

Pupil Transportation

Pupil transportation was left at the previous year expenditure level pending further study. This also has been the approach of the evidence-based model in terms of estimating statewide costs. But we strongly recommend also that the actual transportation reimbursement not be the statewide average figure for each district, but their actual expenditures per pupil for transportation in the previous year because transportation needs vary widely across districts not only in Ohio but in all states. Further, we suggest, as does the OEBM model, that transportation reimbursement be moved to a separate categorical program based on a study of the key factors that drive such expenditures: numbers of students transported, miles driven, and time for such services. There are several standards-based approaches that could be used to construct such a formula, as the state should not use previous years' expenditures per pupil in the future.

Adjustments for Cost Differences

Both models make an adjustment for salary differences based on district characteristics. The evidence-based model uses either an Hedonic wage index, or a comparable wage index. These are standard economic and econometric approaches to adjusting dollar figures for varying costs of buying education resources across geographic and labor market regions in the state. Because Ohio has many regional differences, some sort of regional cost adjustment is appropriate. The purpose of such adjustments is to give every district equal "buying power" for teachers and other staff. An Hedonic index takes local amenities and dis-amenities into account and adjusts funding to accommodate these differences across districts. A comparable wage index, rather than attempting to estimate the amenities, relies on the larger wage market to make such adjustments and compares the relative wages in each area (controlling for differences in the composition of the wage earners) and then provides districts with an adjustment. Both approaches have been used in other states.

The Ohio Instructional Quality Index takes a different approach by creating an index based on three components – the percent of college graduates in the district, local wealth as measured by a composite index of income and property wealth, and the poverty rate in the district. The index ranges from 0.90 to 1.65 and is applied to the salary portion of the funding system (although it could be applied more universally). We expect that this approach not only adjusts for salary differences caused by the features of varying labor markets across the states, but also for additional educational needs of students, and thus

also enhances the additional resources available in the formula based on counts of poverty students.

Comparison Summary

In sum, although there are differences between the two models at various points, we would conclude that the models appear to be more substantially similar than different. The OEBM appears to provide somewhat fewer resources in a few areas, particularly professional development – and potentially substantially fewer resources for central administration. Nevertheless, as we have found in other states, the courts grant state political leaders latitude and power to modify the core evidence-based model recommendations as they tailor the system to the needs of their particular state and the children in their schools.

The real key to the costs of the model therefore are the prices used to estimate the costs of model inputs, specifically personnel costs. There is some concern in Ohio that the average teacher salary used in OEBM models is too low, which, if true would cause system underfunding. This matter, along with several others is discussed in the next section.

3. OTHER ISSUES

Since the release of the OEBM, there has been considerable discussion of the model and its implications for Ohio. In this section, we offer our thoughts and ideas related to those issues. Our goal here is not to specifically defend the OEBM or the evidence-based model in general, but rather to share our experience and knowledge on these issues to help inform the discussion as educators, legislators, policy makers and the citizens of Ohio consider OEBM and its implications for Ohio school children. The specific issues considered here include the teacher salary level used in the model's cost estimates, the Ohio Instructional Quality Index, and the accountability provisions of the governor's proposals.

Teacher Salaries

An issue that appears to be causing some controversy in Ohio is the salary level used to estimate the costs of the model. OBM used a salary figure of $45,094 plus 14% for benefits to estimate personnel costs. This figure has been subject to substantial criticism because many view it and the benefit percentage as being too low. Specific criticism comes from the use of a simple mean of district average teacher salaries for computing the average salary rather than a weighted mean. A weighted mean averages the salaries of all individual teachers in the state and would more closely reflect the higher salaries generally paid in the larger districts in Ohio – which is why large districts are concerned that OEBM underfunds large districts.

In fact the problem appears to be even more complex in that OBM included all of the community schools in the state in the computation of the average salary. Thus, instead of using just the 611 school districts in the state, an additional 269 community schools – which pay lower average teacher salaries – were also included in computation of the simple mean. If only school districts and just average teacher salaries for each district were used in the computation of the mean, the average teacher salary would have been $50,665. If a weighted mean of the 611 districts were used, the average teacher salary would be $54,210 and if a weighted mean of the 611 districts plus the 269 community schools were used, the average would be $53,431. In short, there is no "one" average teacher salary figure; the figure depends on how it is calculated. In all other states where we have worked, the average teacher salary has been computed on a weighted basis, determining the average by using the individual salaries of all teachers in district-run public schools. Though this is not necessarily the only way to compute the average, it is the common practice across the country.

Thus, we would recommend that Ohio seriously consider using weighted averages to compute average teacher salaries for school districts in this type of modeling and would be concerned that the $45,094 figure is too low to adequately support the OEBM. However, as described below, this is somewhat mitigated by the way the Ohio Instructional Quality Index is computed. Because of this issue we expect that if used in conjunction with the Ohio Instructional Quality Index, the simple average for the 611

districts of $50,665 would be a reasonable number to use provided there was confidence that the 14% figure for benefit costs is accurate.

We also think the benefit level of 14% is probably too low. It is our understanding that the 14% represents the cost of the teacher retirement system in Ohio, which covers this important component of compensation and since it is our understanding that Ohio teachers do not participate in Social Security the figure of 14% appears adequate for pension costs. However, this figure does not include other benefits such as health care, which must also be funded for schools to have adequate financial resources.

Ohio Instructional Quality Index

The Ohio Instructional Quality Index is designed to adjust for education cost differences among districts across the state. As described in section 2, the Ohio Index differs from traditional Hedonic or comparable wage indices. The effect of those differences is to create an index with a much larger range than is typically found in other wage indices. We generally expect a wage index to vary by 10 to 15 percent, whereas the Ohio Index ranges from 0.95to 1.65. Moreover, the use of poverty, wealth and college graduation rates in the index has the effect of giving large, mostly poor, urban districts much higher index values. Thus, when multiplied by the average salary figure, the use of the index should accommodate the typically higher salaries also found in the cities.

While we generally recommend weighted average salary computations and an Hedonic or comparable wage index, without computing one of those indices, we are unable to compare the effects of the Ohio proposal with our approach. We do suspect that he benefit figure used in OEBM is lower than what we would use. The use of the lower average wage would, we expect, disadvantage larger urban districts whereas the use of the Ohio Instructional Quality Index would have the opposite effect, which is stronger but difficult to compute.

Accountability Provisions

How districts will be held accountable for the provisions of the OEBM is also a matter of considerable debate in Ohio. Some argue that the OEBM proposal will require all districts to use the resources they receive exactly as specified in the model, while others (see for example Hill, 2009) call for nearly complete flexibility in the use of resources while holding districts and schools accountable for student outcomes. This debate over input vs. outcome accountability is central to accountability discussions taking place throughout the country and is critical to the successful implementation of any education and school finance reform.

Our views fall somewhere in the middle of this issue. First, we are supportive of holding schools accountable for student performance outcomes. Ohio needs a multifaceted accountability system to ensure this result. In terms of use of resources, however, our research suggests that schools that implement programs as outlined in the evidence-based model more often than not exhibit substantial gains in student performance in a relatively

short time. Thus, if the goal of the OEBM is to improve learning for all, total flexibility may not be the best answer either.

Our research in Washington and Wisconsin, as well as research by others, (see Odden & Archibald, 2009 and Fermanich, Mangan, et. al., 2007) identified a number of schools that had made substantial improvements in student performance in recent years. In analyzing the strategies those districts were using, we found that they had implemented strategies similar to those identified by research as leading to higher student performance – the same strategies used in developing the resources for the evidence-based model.

In addition, our work in Arkansas and Wyoming provides evidence that absent some guidelines about how to organize schools for success, many districts are unable to organize in ways that lead to improved student performance, instead making choices that prove to be ineffective in helping students learn. As a result, we think an accountability system needs to be designed that allows schools flexibility to develop programs that meet the specific needs of their students, but in the absence of clear improvements in a relatively short period of time, we would recommend that the evidence-based strategies that are funded through the system be employed before additional funds are allocated. This is efficient in terms of taxpayer dollars, but provides schools with immediate strategies that will enable them to meet student learning expectations.

While we agree that the research on which the recommendations of the evidence-based model are based has limitations, and we strongly favor continued research into programs that will lead to improved student outcomes, we also believe that in many cases, schools would be better off using methods that have evidence of success than they would trying to invent new programs on their own.

In summary, our recommendation is that the state develop an accountability system that focuses on districts and schools that are not meeting performance expectations and provides them with guidance and professional support to enact research-based programs that have evidence of success. For those districts meeting agreed-upon performance objectives using alternative approaches, we would not recommend changes to their programs provided they continue to improve.

4. CONCLUSIONS

The OEBM represents a major step forward in Ohio school finance and educational accountability. It proposes to establish an evidence-based and practical method for distributing funds to schools. Like any new school finance proposal, there are a number of unanswered questions facing state policy makers, and undoubtedly a number of complexities in the implementation of this or any new program.

An evidence-based model represents a fundamentally different way to think about school reform and the finance provisions that accompany that reform. Specifically the OEBM estimates funding levels from the school, not the district level. In addition, OEBM would require rethinking and reallocating all resources in a school, not only those at the margin. We believe the resources embedded in the evidence-based model are sufficient for schools and districts in Ohio to make the substantive progress in student achievement on state tests we refer to as doubling. By using the power of all the money available to schools, combined with a growing research base on what kinds of programs work to improve student learning, Ohio has the potential to shift the debate on education away from how much money is needed to how it can most effectively be used to improve student learning.

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